Preliminary estimates and patterns of Anglerfish discard in the Spanish bottom trawl Coastal area fishery.

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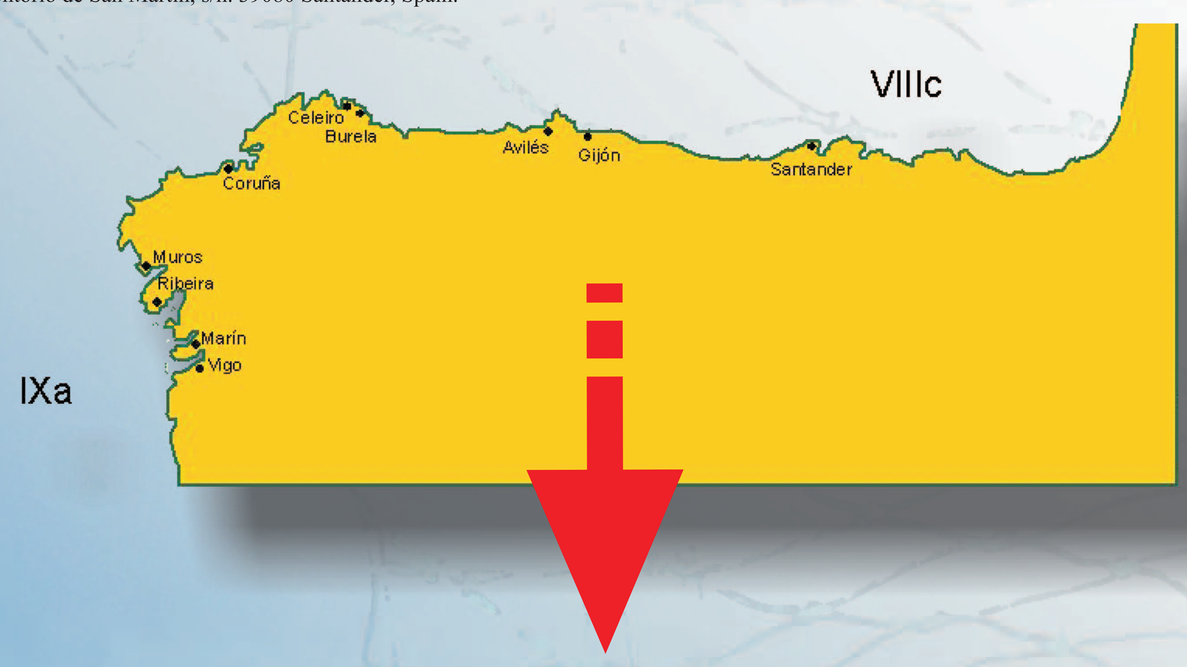
INTRODUCTION

The "Spanish Discard Sampling Programme" was started in 1988, however it has not had a continuous implementation in time. Nevertheless, since 2003, the "Community Sampling Fishery Programme" was completely implemented in Spain. Anglerfish (*L. piscatorius*, *L. budegassa*) are considered an objective catch for the Spanish trawler fleet, owing to their commercial value. This study is focussed on Anglerfish OTB discards, in the southern stock (ICES divisions VIIIc, IXa). Estimations of discard and retained fractions share most of the graphs fitted below, showing how much information usually lacks on data from market samples. Show the incidence of discarding actions and find out patterns on discard behaviour is the main objectives in the present work.



METHOD

Raw data used in this study were recorded by observers, sampling on-board the Spanish trawler fleet, that operates in ICES areas VIIIc and IXa. Data available corresponds to the years '94, '97, '99-00, and the '03-'06 annual series.

Total landings and effort of the fleet were examined as raising auxiliary variables , choosing the earlier estimation for further analysis. Information was integred to decades and showed as histograms.

To test the reliability of data a comparison has been carried out against results from WGHMM (ICES,2006) and Spanish demersal surveys data.

Owing to their different market values, both species of anglerfish has been analyzed separately (GLM), in expect to find out differences on discards behaviour.

Table 1

discards rate (%)		1994	1997	1999	2000	2003	2004	2005	2006
	vessels sampled	18	29	28	31	20	16	19	18
	trips	33	45	35	85	31	29	51	42
by weight	*Lophius budegassa*	1.7	1.4	2.4	1.1	0.4	2.7	5.8	11.9
	Lophius piscatorius	1.7	0.3	0.3	1.9	2.4	7.5	5.0	6.4
by number	*Lophius budegassa*	14	15	32	10	10	23	39	44
	Lophius piscatorius	46	7	20	53	19	67	48	53

RESULTS

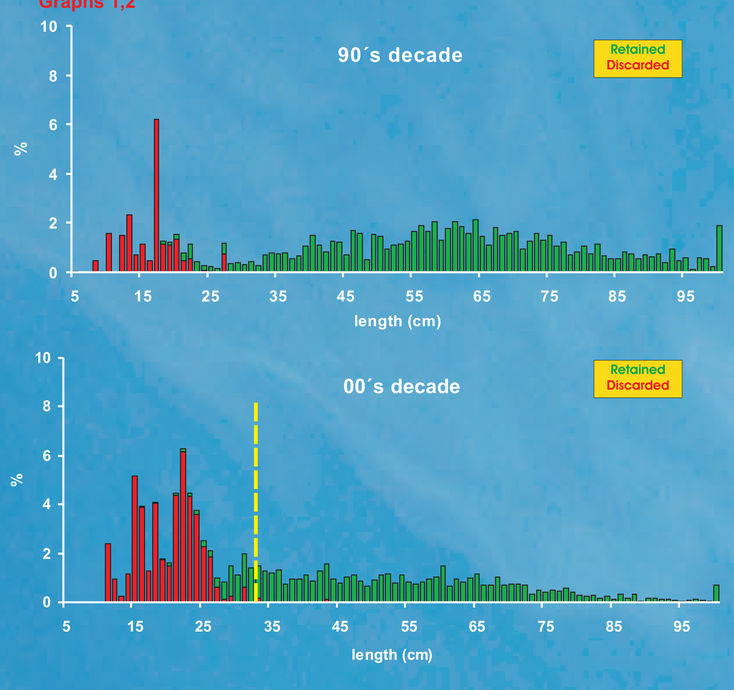
Table 1 summarize the sampling effort and discards ratio by specie.

Graphs 1 to 4: Catch length distributions in percentage terms. Broken line represents the length corresponding with Minimum Weight Size (500grs), implemented since 2000. Discarding is mostly on the smallest individuals. Discarding rate on White anglerfish for the period of ´00 - ´06 is higher than the 90´s years (+22%). No substantial variations is showed on black anglerfish (+5%).

Graphs 5,6 combines the estimations of discarding for of all the years available. The comparison shows that only IQR from '00 years reach 20 cm length size.

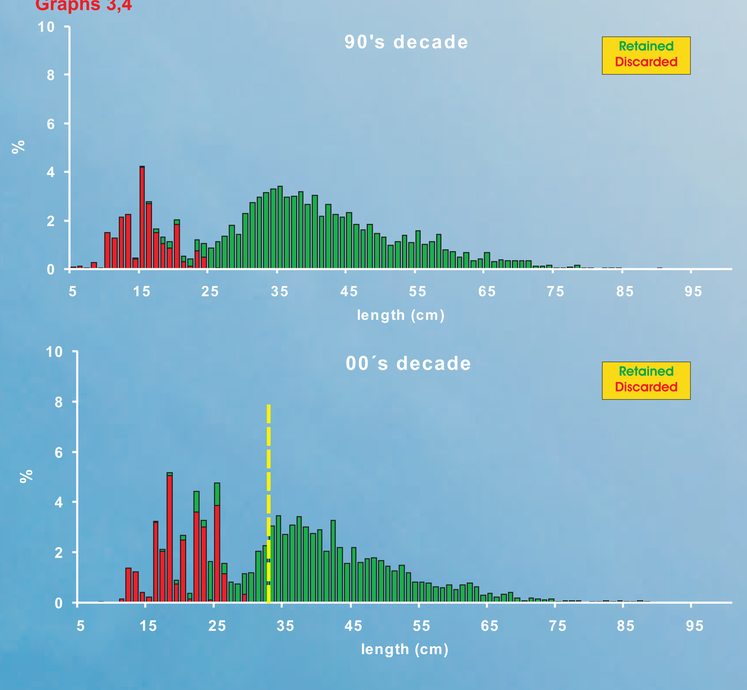
WHITE ANGLERFISH

Graphs 1,2

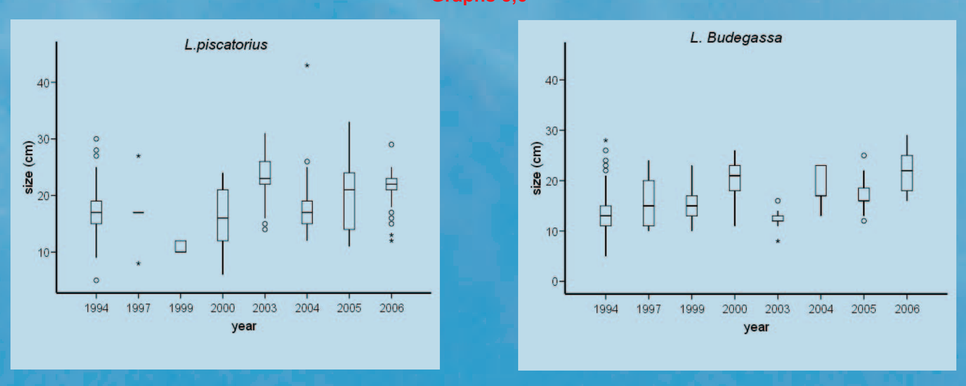


BLACK ANGLERFISH

Graphs 3,4

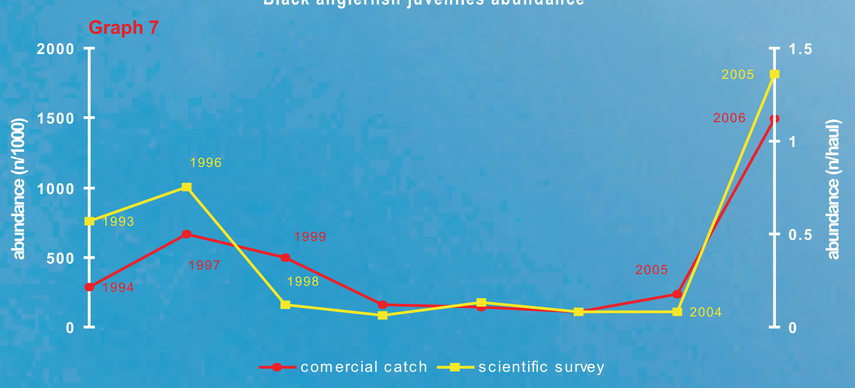


Graphs 5,6



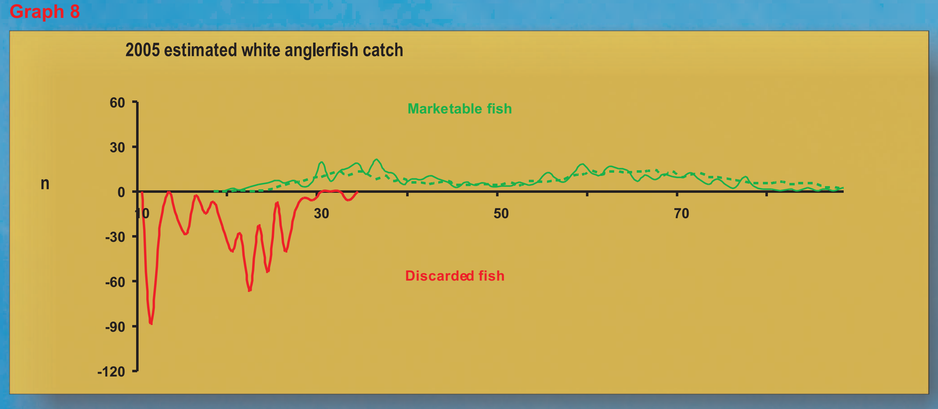
Significant correlation was found (Rho=0.028) comparing the fleet catches on black anglerfish Juveniles versus abundance estimated by spanish surveys (>30cm). Abundances were correlated coupling each year of comercial estimations, with scientific data from the previous year (Graph 7), lessening bias owing to differences on catch lenght distributions.

Graph 7

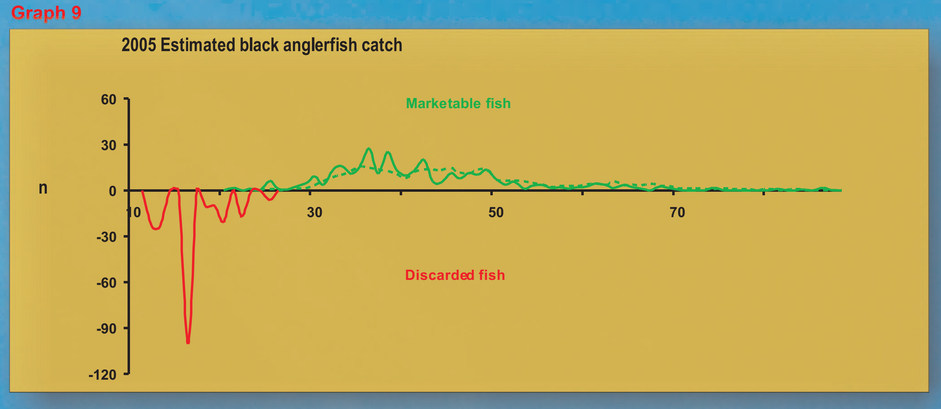


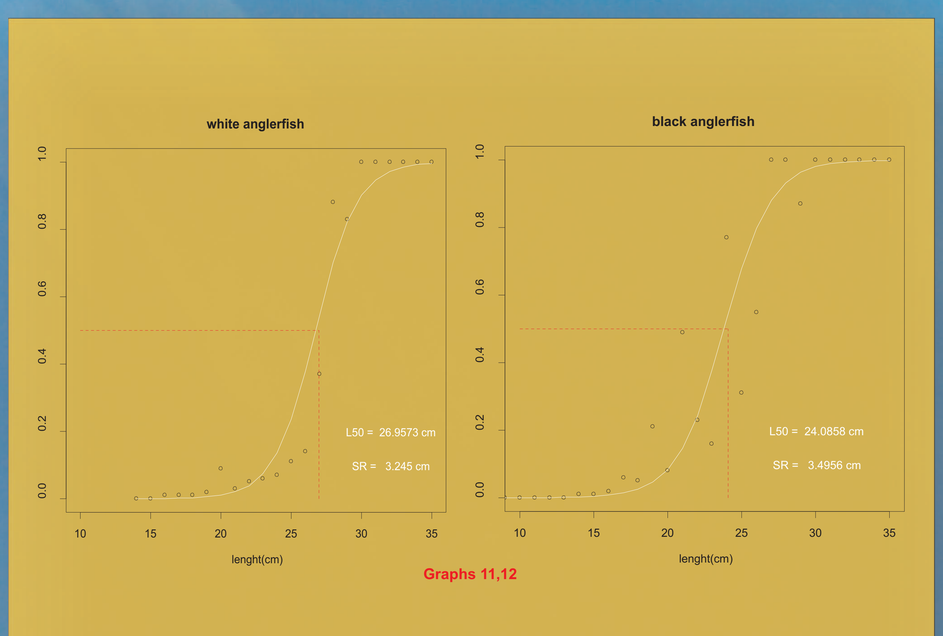
Estimations of 2005 catches (n/1000 by length class) from Observers program (solid line) are compared with data from market samples (dots) in Graphs 8,9. No statistical significant differences was found (K-S test) on Length distribution of marketable fish. Plots below the x-axis represent the estimation of the discard values by the observers program data. This information is lack in WGHMM.

Graph 8



Graph 9





Graphs 11,12

A generalized linear model (GLM) with binomial distribution and logit link (McCullagh and Nelder, 1989), was the underlying statistical model used to analyse the discards behaviour observed on board (Graphs 11,12). We found significant differences between RL50´s (t=79.25, alpha= 0.001).Black anglerfish, the specie with higher commercial value in Spanish markets is historically retained at a lower size (RL50= 24cm) than white anglerfish (RL50=27cm), .

We thank all the help and assistance given by the Spanish Fisheries organisation, and the vessels owners, as well as to the skippers and crews of these vessels. We are also thankful to all observers. Special thanks are given to Hortensia Araujo, responsible for observers onboard.

DISCUSSION AND CONCLUSSIONS

The comparison carried out in the present work between onboard data with another sources of information, shows the high reliability of the estimations from the observers recordings, and also provide an overview of how much of fishing information is lost when discards data is not available.

✓ Discards on anglerfish species affects mostly on the small individuals.

✓ Economical value is the underlying reason to throw back to sea part of the anglerfish caught.

✓ There is not knife-edge effect on discards length distribution once WML has been implemented.

✓ Finally, results of discarding ogives provide a slight support to the assumption that market values for both species can be a factor affecting discards behaviour on board, but further analysis should be carried out to find clear differences in discards behaviour between both species.

Reference:

ICES (2006). Report of the Working Group on the Assessment of Sourthern Shelf Stocks of Hake, Monk and Megrim (VGHMM). Bilbao, Spain, ICES: 792 pp.

McCullagh P., Nelder J.A., 1989, Generalized Linear Models.Chapman and Hall, London.